THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TAKASHI NAGAI, AKIRA OKANO, MASASHI TAKAHASHI,
TAKAYOSHI KARIYA, HIROYA KADOKAWA,
HITOMI HIRAKO, MASASHIGE KUWAYAMA, and SEIZO HAMANO

Appeal No. 1996-2211
Application 08/018,546[1]

HEARD: April 4, 2000

Before WILLIAM F. SMITH, SCHEINER and ADAMS, Administrative Patent Judges.

ADAMS, Administrative Patent Judge.

DECISION ON APPEAL

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[1] Application for patent filed February 17, 1993.

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 5-9, all the claims remaining in the application. Claims 5, 6 and 8 are representative of the subject matter on appeal and read as follows:

5. A method of transporting bovine embryos which have not been frozen which comprises transporting said bovine embryos in a transportation medium comprising a thiol compound selected from the group consisting of $-mercaptoethanol, $-mercaptoethylamine, glutathione, dithiothreitol and "-thioglycerol, while maintained in non-frozen condition.

6. The method of claim 5, wherein said bovine embryos are transported while maintained at 37EC.

8. The method of claim 5 wherein the thiol compound is $-mercaptoethanol.

The references relied upon by the examiner are:

Hasler et al. (Hasler), Journal of Animal Science, Volume 49, Supplement 1, pp. 135-136 (February 1979).

Takahashi et al. (Takahashi), Theriogenology, Volume 39, Number 1, p. 326 (January 1993).
Ealy et al. (Ealy) Cell Biology International Reports, Volume 16, Number 2, pp. 125-131 (February 1992).

BIOSIS ABSTRACT: Bannai, S., (Bannai) Hum. Cell (Japan), Volume 5, Number 3, pp.292-297 (September 1992)[2].

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[2]While a translation of the full Bannai reference appears in the file wrapper, the examiner's rejection relies only upon the abstract. We have considered the translation of the full text article.

Yang, et al. (Yang) Theriogenology, Volume 35, Number 1, p. 297, (January 1991).

Claims 5-9 are rejected under 35 U.S.C. § 103 as unpatentable over Hasler et al., taken with Takahashi et al., Ealy et al., or Bannai. We reverse in lieu of new grounds of rejection under 37 CFR § 1.196(b).

DISCUSSION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims, and to the respective positions articulated by the appellants and the examiner. We make reference to the Examiner's Answer (Paper No. 13, mailed December 27, 1994), and the Supplemental Examiner's Answer (Paper No. 16, mailed April 17, 1995) for the examiner's reasoning in support of the rejection. We further reference appellant's Brief (Paper No. 12, filed October 3, 1994), and appellant's Reply Brief (Paper No. 14, filed January 23, 1995) for the appellants' arguments in favor of patentability.

The claims on appeal are directed to a method of transporting non-frozen bovine embryos in a transportation medium containing a thiol compound.

Claims 5-9 are rejected as unpatentable over Hasler taken with Takahashi, Early, or Bannai. Hasler teaches the survival of bovine embryos subjected to six different methods of transportation. The transportation medium of Hasler is PBS supplemented with 1, 9 or 16% FCS. Hasler reports that "[n]o

difference in pregnancy rates resulted from storage of embryos in PBS containing 9% vs. 16% FCS." Presumably, since Hasler does not expressly mention it, and the results of treatment regime V are statistically similar to Hasler's other treatment regimes, there is no difference in pregnancy rates resulting from storage of embryos in PBS containing 1% FCS.

There is some debate on the record as to the temperature that Hasler used to transport the bovine embryos. However, appellants' state at page 5 of their Brief that "it is believed that transportation is effected by placing the embryos in PBS containing FCS and transporting them at room temperature." Since the only mention of a temperature in Hasler is "room temperature" we agree with appellants' characterization. We also agree with appellants' characterization at page 3 of their Brief, "that 37EC corresponds to about 99EF which is achieved by using a 'warm box.'"

Hasler teaches the use of what appears to be a minimal transportation medium, PBS supplemented with FCS. Hasler, however, does not teach the use of a thiol compound in their transportation medium. To overcome this deficiency in Hasler, the examiner relies upon the teachings of Takahashi. (cysteamine[3]), Ealy (glutathione), and Bannai ($-mercaptoethanol), each of which teach a thiol compound as part of a culture medium for bovine embryos.

[3] Appellants' specification at page 3 defines cysteamine as $-mercaptoethylamine.

According to the examiner, "[i]t is well within the purview of the skilled artisan to substitute one well known bovine embryo culture medium for another one. . . . It would have been further obvious to substitute the culture mediums of Takahashi, Ealy or Bannai for the culture medium of Hasler in view of the advantageous in which Takahashi, Ealy and Bannai teach for their particular mediums." *See,* Examiner's answer at page 4. However, the mere fact that the prior art could be so modified, would not have made the modification obvious unless the prior art suggested the desirability of the modification. *In re Laskowski*, 871 F.2d 115, 117, 10 USPQ2d 1397, 1398-99 (Fed. Cir. 1989); *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1123, 1127 (Fed. Cir. 1984). In combining the references, the examiner did not provide a "reason, suggestion or motivation" which would have lead one to modify Hasler's method. As stated in *Pro-Mold and Tool Co. v. Great Lakes Plastics Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629 (Fed. Cir. 1996):

> It is well-established that before a conclusion of obviousness may be made based on a combination of references, there must have been a reason, suggestion or motivation to lead an inventor to combine those references.

Hasler teaches the safe and effective transport of bovine embryos in a minimal media. Each of the secondary references teaches a culture media containing a thiol compound can support, increase, or improve bovine embryo development and/or survival. At page 4 of the Examiner's Answer, the examiner concludes that, "[i]t would have been further obvious to substitute the culture mediums of

Takahashi et al, Ealy et al or Bannai for the culture medium of Hasler et al in view of the advantageous in [sic] which Takahashi et al, Ealy et al and Bannai teach for their particular mediums." The absence of a "reason, suggestion or motivation" in the examiner's statement of the rejection constitutes legal error.

In addition, none of the references relied upon by the examiner addresses the limitation of claim 6, drawn to transportation at 37EC. Claims 7 and 9 depend from claim 6, therefore, they also require transportation at 37EC. In the bridging paragraph of pages 7-8 of the Examiner's Answer, the examiner states:

> . . . However, the secondary references, Takahashi et al and Ealy et al, both discuss the beneficial effects of the thiol compound on bovine embryos which are cultured at temperatures ranging from 42EC to 38EC [sic]. Thus one of ordinary skill in the art would have a reasonable expectation that the thiol compound would have a beneficial effect on the embryos at temperatures higher then [sic] room temperature, *per se*. Accordingly, the skilled artisan would have a reasonable expectation of success in transporting the bovine embryos in the thiol compound at temperatures in the range of 37EC.

The examiner's position is not convincing in view of Ealy's teaching that glutathione[4] was not effective at a temperature less than 42EC. Appellants' Brief, at page 7, in reference to Ealy states "[a]t 38.5EC neither additive was beneficial." The examiner has not explained why the facts support the conclusion

[4] We also recognize that Ealy use glutathione at a concentration of 50nM, which is outside the range required by claim 7.

that "one of ordinary skill in the art would have a reasonable expectation that the thiol compound would have a beneficial effect on the embryos at temperatures higher then [sic] room temperature, *per se*."

The Bannai abstract relied upon by the examiner merely states "[r]ecently it has been found that 2-mercaptoethanol is effective in the . . . *in vitro* development of bovine embryos." Keeping in mind that the examiner relies upon the Bannai abstract, not the translation of the full text article, the examiner has not explained how the abstract provides an enabling description of how $-mercaptoethanol was used to have an effect on bovine embryos.

For the reasons above, we find the examiner has not established a *prima facie* case of obviousness. Accordingly, the rejection of claims 5-9 under 35 U.S.C. § 103 is reversed.

NEW GROUNDS OF REJECTION UNDER 37 CFR § 1.196(b)

I. Claim Interpretation:

"The name of the game is the claim." *In re Hiniker Co.*, 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998). In considering the issues raised in this appeal, we point out that "analysis begins with a key legal question – what is the invention claimed?" since "claim interpretation . . . will normally control the remainder of the decisional process." *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1596 (Fed. Cir.), *cert. denied*, 481 U.S. 1052 (1987). The claimed invention is drawn to a "[m]ethod of transporting bovine embryos . . . which comprises

transporting said bovine embryos in a transportation medium" The specification provides no definition for the terms "transporting" or "transportation medium."

We recognize that appellants and the examiner have engaged in a debate on the record involving these terms. Specifically, page 6 of the Examiner's Answer addresses this issue:

> Appellants indicate that the specification teaches that the results obtained using the claimed method were performed with a duration of transportation time of 18.3 hours. However, it should be noted that the claims do not reflect a duration of transportation time. Thus the breadth of appellants argument is not commensurate in scope with that of appellants claims.

Appellants' respond to this, in the bridging paragraph of pages 2-3 of their Reply Brief, by stating:

> Clearly, the fact that embryo survival is benefited on lengthier trips is an advantage of the claimed method and supports the patentability of the claims rather than detracts therefrom. One designs a transportation medium to survive maximum expected stresses, not minimum stresses.

In response, the examiner states at page 3 of the Supplemental Examiner's Answer:

> [T]he claims do not indicate criticality to the fact that such transportation is to assure survival as opposed to development.

Given the ambiguity of the terms "transporting" or "transportation medium" it is difficult to distinguish between a "transportation medium" and a culture medium. Webster's Seventh Collegiate Dictionary 941 (7th ed. 1963)[5] defines "transport" and "transportation" as:

> **Transport: 1:** to convey from one place to another: CARRY.
>
> **Transportation: 1:** an act, process, or instance of transporting or being transported. **3a:** means of conveyance or travel from one place to another.

Therefore, the claims are open to two possible interpretations: (1) transportation over a nominal distance, e.g. from a laboratory bench to a "warm box"; or (2) transportation over long distance, e.g. from the laboratory to a farm for implantation of the embryos. As set forth in *In re Morris*, 127 F.3d 1048, 1056, 44 USPQ2d 1023, 1029 (Fed. Cir. 1997):

> It is the applicants' burden to precisely define the invention, not the PTO's. *See*, 35 U.S.C. § 112, second paragraph ("The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). While it is true that the claims were not rejected on the ground of indefiniteness, this section puts the burden of precise claim drafting squarely on the applicant. The problem in this case is that the appellants failed to make their intended meaning explicitly clear.

[5]A copy of page 941 from Webster's Seventh Collegiate Dictionary (7th ed. 1963) is attached to this decision.

II. Effect of claim interpretation on the application of prior art.

Upon review of Takahashi we find bovine embryos cultured in TCM-199 supplemented with 10% FCS containing 10 or 50 TM cysteamine at 39EC. We note that appellants' claims use the term "comprising" to allow for the inclusion of TCM-199 supplemented with 10% FCS in the medium. In fact, appellants' specification, at page 3, describes the medium as including TCM-199 supplemented with 10% FCS. While Takahashi is silent with regards to the term "transporting," some movement, "transport," of the culture from one place to another during the study, even if it was simply from the "warm box" to the lab bench, would be a necessary or inherent step in the process. The results obtained in Takahashi suggest to one of ordinary skill in the art to include the low molecular weight thiol compound, cysteamine, in the culture of bovine embryos, due to its significant effect of blastocyst development. Takahashi teach "development to blastocysts was significantly higher when embryos were cultured in the medium containing 10 and 50 TM cysteamine than when they were cultured in the medium without cysteamine

(Table 1)."

Accordingly, we make the following new grounds of rejection under 37 CFR § 1.196(b):
If the claims are interpreted as transportation over a nominal distance, e.g. from a "warm box" to a laboratory bench, then a "transportation medium" is not distinguishable from a culture medium.

Similarly, with this interpretation, a "[m]ethod of transporting bovine embryos" is not distinguishable from a method of culturing bovine embryos. In this instance, claims 5 and 7 are rejected under 35 U.S.C. § 102(a) as anticipated by Takahashi. As set forth in *RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir 1984):

> Anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention. (citation omitted).

Takahashi teach an improved medium for the culture of bovine embryos. This medium includes TCM-199 supplemented with 10% FCS containing 10 or 50 TM cysteamine at 39EC. Takahashi teach that development to blastocyts was significantly higher when embryos were cultured in the medium containing 10 and 50 TM cysteamine than when they were cultured in the medium without cysteamine. While Takahashi is silent with regards to transporting steps, the process inherently includes the step of moving cells from e.g. the laboratory bench to the "warm box." Therefore, the claimed method of transporting, comprising transporting bovine embryos in a transportation medium containing a thiol compound, is described and, thus, anticipated by Takahashi.

In the alternative, the claims can be interpreted as transportation over a long distance, e.g. from the laboratory to a farm for implantation of the embryos. In this instance, claims 5 and 7 are rejected under 35 U.S.C. § 103 as unpatentable over the combined teachings of Takahashi and Hasler.

Takahashi teaches an improved medium for the culture of bovine embryos. This medium includes TCM-199 supplemented with 10% FCS containing 10 or 50 TM cysteamine at 39EC. Takahashi teaches that development to blastocysts was significantly higher when embryos were cultured in a medium containing 10 and 50 TM cysteamine than when they were cultured in a medium without cysteamine. While Takahashi is silent with regards to transporting steps, a culturing process includes the step of moving cultures a nominal distance, e.g., the laboratory bench to the "warm box." Takahashi does not teach the transport of bovine embryos over a long distance e.g. from a laboratory to a farm for implantation. However, Hasler teach that bovine embryos can be safely and effectively transported in a minimal medium (PBS supplemented with FCS), and under a wide range of transportation conditions.

In our view, it would have been *prima facie* obvious to a person of ordinary skill in the art at the time the invention was made to transport bovine embryos in the improved medium taught by Takahashi. Since Hasler demonstrates that bovine embryos can be successfully transported in a minimal medium, it would have been obvious to maintain the embryos in the improved medium taught by Takahashi during culture and subsequent transportation, since the improved medium significantly aids in the development of the embryos. Furthermore, there would be no reason to replace the improved Takahashi medium with a different transportation medium given the results obtained by Hasler.

We recognize appellants' reference to unexpected results. At page 3 of their Brief, appellants state "[a]s shown in Table 2, and contrasted with the transportation procedure which use no thiol, the percentage of surviving embryos was increased very significantly and the percentage of excellent embryos was increased dramatically." To distinguish the results of Table 2[6] of the specification with results from studies in which thiol compounds were not present in the media, appellants state, in the bridging paragraph of pages 5-6 of the Brief, "[t]he reference Yang . . . describes the effect of temperature conditions in preserving fresh bovine embryos. It can be understood from this reference . . . that the survival ratio of embryos is relatively high in incubation for a short time of 4 to 6 hours, but the survival ratio drastically drops in incubation for a long time." The results obtained by Takahashi, Table 1, are exactly the same as those set forth in appellants' specification, Table 1, regarding the number of embryos that developed to blastocyst stage when cultured in the presence of 10 or 50TM cysteamine. The survival rates obtained by appellants are therefore <u>expected</u> not unexpected. In order for a showing of "unexpected results" to be probative evidence of non-obviousness, it falls upon the applicant to at least establish: (1) that there actually is a difference between the results obtained through

[6] Example 2, page 6, of appellants specification states that "[b]ovine embryos . . . cultured in Example 1 were used for transpotation [sic] experiments." Upon consideration of Example 1, it is unclear to us whether the bovine embryos used in the transportation experiments of Example 2, were originally cultured in the presence or absence of a thiol compound. If prosecution is continued on this subject matter, appellants should clarify the specifics of example 2's control sample. For example, where the control embryos cultured in the presence or absence of a thiol compound prior to transportation.

the claimed invention and those of the prior art; and (2) that the difference actually obtained would not have been expected by one skilled in the art at the time of the invention. *In re Freeman*, 474 F.2d 1318, 1324, 177 USPQ 139, 143 (CCPA 1973).

We also recognize appellants' attempt to distinguish culture medium from transportation medium, in their September 22, 1993 (Paper No. 3) response. Appellants state "when culturing embryos, conditions of CO_2 concentration of 5% and a humidity of 100% are inevitable, and the circumstances surrounding embryos are different from those occurring during transport." While appellants appear to be making this statement in reference to transporting embryos in a frozen state, we address their concerns as they may apply to the above new grounds of rejection. Claim 5 states "[a] method of transporting bovine embryos . . . which comprises transporting said bovine embryos in a transportation medium comprising a thiol compound . . . while maintained in a non-frozen condition." While the claims do not require any particular condition of transport other than the presence of a thiol compound in the transportation media, the "which comprises" language of claim 5 does not exclude the maintenance of the embryos in conditions different from those suggested by appellants. Therefore, the basis for distinction is not appropriate given the current language of the claims.

OTHER ISSUES

Upon return of the application, the examiner should take a step back, review all pending claims in this application and:

1. Clarify the scope of these terms "transporting" or "transport medium". Thereafter, the examiner should determine the effect, if any, the scope of these terms has on patentability of the claimed invention.

2. Obtain a copy of Takahashi et al.[7] Animal Reprod. Sci. "[e]ffect of 2-mercaptoethanol on development of bovine IVF embryos," to determine the effect, if any, this reference has on the patentability of the claimed invention.

3. Determine whether a transportation temperature of 37EC would have been obvious in view of the prior art.

SUMMARY

We have reversed the examiner rejections and instituted a new ground of rejection, pursuant to 37 CFR § 1.196(b), of claims 5 and 7. Claims 6, 8 and 9 are now free of a rejection. However, both the appellants and the examiner should take into consideration the "Other Issues" raised above.

[7]The full text translation of Bannai makes reference to a second Takahashi reference. *See*, Bannai, Reference No. 20.

TIME PERIOD FOR RESPONSE

This opinion contains a new ground of rejection pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Rig. 53, 131, 53, 197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that, "[a] new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner.

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED: 37 CFR § 1.196(b)

William F. Smith Administrative Patent Judge	)
Toni R. Scheiner Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
Donald E. Adams Administrative Patent Judge	)

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